

A 50-Year Prospective Study of the Psychological Sequelae of World War II Combat

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A 50-YEAR PROSPECTIVE STUDY OF THE PSYCHOLOGICAL SEQUELAE OF WORLD WAR II COMBAT

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ABSTRACT

Objective: The authors take advantage of a 50 year prospective study of World War II veterans to examine the predictors and correlates of combat exposure, PTSD symptoms and trait neuroticism (NEO).

Method: The subjects were 107 veterans who had been extensively studied before and immediately after serving overseas in World War II. All served as members of the study until the present time and 91 filled out both questionnaires of PTSD symptoms and neuroticism.

Results: In this study group variables associated with positive psychosocial health in adolescence and at age 65 predicted combat exposure. Combat exposure and number of physiological symptoms during combat—but not during civilian stress—predicted symptoms of PTSD in 1946 and 1988. Combat exposure also predicted early death and study attrition. Psychosocial vulnerability in adolescence and at age 65 and physiological symptoms during civilian—but not during combat stress—predicted trait neuroticism at age 65.

Conclusion: Combat exposure predicted symptoms of PTSD but not non-specific measures of psychopathology. Premorbid vulnerability predicted subsequent psychopathology but not symptoms of PTSD.

"Wheat fell headless in the field
Till Death did reap enough.

We seek to bury the revealed
No earth is deep enough.

You cannot wash the stains from
minds
No one can weep enough.

Nor shut the past behind the
blinds
No night has sleep enough."

— —Study member

Over the last fifty years investigators have learned a great deal about veterans' emotional response to war. Most of this knowledge comes from the research on Vietnam War veterans that has refined and replaced the WW II diagnosis of "combat fatigue" with the current concept of Post-traumatic Stress Disorder (PTSD). Understandings gleaned from the study of Vietnam veterans have already been used to study WW II veterans^{1, 2} and their enduring stress reactions.

A major limitation of most studies of PTSD is that they are retrospective and may confuse cause and effect. Recently, three studies have examined PTSD risk factors in three time frames of data collection: prewar, wartime, and postwar.³⁻⁵ However, thus far these studies have only included Vietnam War veterans. To the authors' knowledge, similar studies have not been undertaken in WW II veterans. Judging from research on Vietnam War veterans, combat exposure per se appears to be the most reliable wartime predictor of PTSD,^{3, 6} especially exposure to atrocities.^{4, 7}

Precombat personality vulnerability to the development of PTSD symptoms, however, remains poorly charted territory. First, few prospective studies have sought psychological risk factors that predispose individuals to the development of PTSD.^{3, 5} Second, because during the Vietnam War the undereducated and the socially disadvantaged were at greatest risk for combat exposure,^{4, 7} it was hard to separate the role of these variables from that of combat in the etiology of PTSD.

Data from The Study of Adult Development, initiated in 1938, have allowed us to study prospectively 107 young men as prewar college students, as recently returned WW II overseas veterans, and then, four decades later, as 65 year old grandfathers. In this report, we will first examine whether "chance" alone determines a person's degree of combat exposure, as Hendin & Haas⁸ suggest, or whether there are premorbid factors which may predispose vulnerable individuals to participate in dangerous combat. Second, we will seek to identify premorbid variables which either predispose an individual to PTSD symptoms or which protect individuals with high combat exposure against their future development. Third, we will examine the relative contributions of psychological vulnerability per se and severe combat trauma per se to the development of PTSD symptoms and their persistence into middle life. Finally, we will note the effects of combat and/or PTSD on men's lives at age 65.

METHODS:

Subjects: The original study group of the "Grant Study of Adult Development" consisted of 268 undergraduates who were chosen by the Harvard University Health Services from the classes of 1939-1944. The men were selected during

their sophomore year for being in the top half of their class, being physically and mentally healthy, and being viewed by the college deans as having the potential for success.^{9, 10} Nineteen of the men withdrew from the study early or died in WW II. Of the remaining 249 men, 152 served overseas and were potentially at risk for combat; 107 of these men were alive and returned questionnaires in 1988.

All of the men were intensively studied in a multidisciplinary fashion before World War II; most were also personally interviewed directly after WW II and again between the ages 47-57. Physical examinations have been obtained every 5 years since age 45. The men have also been followed by means of biennially mailed questionnaires for 50 years or until death .

Measures:

I. PREWAR VARIABLES (n=152):

a. **Social Class of Parents (n=113):** After home visit and family interview the men's family's social class was rated on a five-point scale: 5 = upper, 4 = upper/upper-middle, 3 = upper-middle, 2 = middle, 1 = working class/blue collar.

b. **Childhood environmental strengths (n=151):** The men's childhood environment was rated by two research assistants blind to data from the men's later life. The 20 = excellent, 0 = bleak scale was based on all available data on the men's childhoods and from parental interviews prior to age 20. The scale focused on warmth of relationships with parents, siblings and presence or absence of childhood emotional problems. Methods and reliability are discussed elsewhere.¹¹

c. **Psychological Soundness in College (n=149):** After three years of interviews and testing, on the basis of all available data each man was rated by staff consensus 3 = "thoroughly sound", 2 = minor flaws, 1 = definite "emotional or personality handicap."⁹

d. **Active College Sports Participation (n=110):** 3 = active sports participation, 2 = 2-9 hr/wk, 1 = less than 2 hr/wk.

e. **Physical Symptoms with Stress (age 19) (n=150):** The number of different effects of stress on the body was assessed by interview and observation on a 1 to 15 scale. Symptoms included: palpitation, abdominal pain, headaches, diarrhea, constipation, urinary frequency, insomnia and the men's observed response to needle stick.

II. WARTIME VARIABLES:

Directly after World War II, an elaborate questionnaire with open-ended questions on the men's war experiences was sent out to all participants inducted into the military, with a 97% completion rate. In addition, in 1946 the men were interviewed by the Grant Study staff about their wartime experiences.¹² Both the questionnaire and the interview focused on the effects of the war, the men's exposure to combat, and their descriptions of thoughts and bodily symptoms if and when danger stared them in the face. All wartime variables were scored by a psychiatrist blind to subsequent data.

a. **Attitude toward the military (n=140):** On their war service questionnaire in 1946, the men were asked to rate their "Urge to join the military" and their "Pride of Organization" on a 1 to 7 scale.

b. Combat Exposure Scale (n=152): To assess combat exposure we combined data from a sustained danger scale¹² and a scale of combat experiences. Our intent was to tap both the intensity and frequency of combat experience. We selected those variables thought to be important in the development of PTSD.^{3, 6, 13}

The Combat Exposure Scale summed the following experiences scored 0 (no) or 1 (yes): 1. being under enemy fire; 2. firing at the enemy; 3. killing anyone; 4. seeing allies killed or wounded; 5. seeing enemies killed or wounded; 6. being wounded. Points for sustained danger were added as follows: 0 = no days spent in danger level 7 ("In sustained or heavy enemy action") or level 6 ("In light or sporadic action"). 1 = 1-21 days in danger levels 7 and/or 6, and 2 = 22 days or more in levels 7 and/or 6. In addition, each man received one point if level 6 was reported as the highest level of danger, or 2 points if level 7 was the highest level of danger. Thus, the points assigned ranged from 0-10. All variables in the **combat exposure** scale were significantly inter-correlated at $p < .001$ except that being wounded was not significantly correlated with duration of danger. A combat score > 6 = high combat exposure.

c. Physical Symptoms with Danger (n=150): In 1946 the men were asked what their bodily symptoms had been "if and when danger stared you straight in the face." Each individual symptom was scored 0 = absent, 1 = present. The number of items (including palpitations, abdominal distress, headaches, diarrhea, constipation, sweating, shaking, general nervousness, fear of going crazy, and feeling paralyzed) were expressed as a sum (range 0-8).

d. PTSD 1946 Symptoms (n=150): On the basis of the 1946 interview and questionnaire, 16 symptoms listed in the DSM-III definition of Post-traumatic Stress Disorder were rated 0 = absent and 1 = present. The symptoms were as follows: 1) recurrent and distressing recollections of combat; 2) recurrent distressing dreams of combat; 3) sleep difficulties; 4) angry outbursts; 5) exaggerated startle response; 6) restricted range of affect; 7) cannot recall important aspects of traumatic event; 8) diminished interest in significant activities; 9) estrangement from others; 10) avoids activities/situations of trauma; 11) foreshortened future; 12) acts as if traumatic event were recurring; 13) distress at symbol of trauma; 14) difficulty concentrating; 15) hypervigilance; and 16) avoids thought/feelings of trauma. Although the potential score ranged from 0-16, no man reported more than 6 symptoms.

III. POSTWAR VARIABLES:

a. Number of visits to a psychiatrist by age 65 (n=146):

b. Immaturity of Defenses (age 20-47) (n=109): This was assessed by a nine-point scale (1 = indicating mostly mature and 9 = mostly immature defenses). Examples of adaptive behavior at times of crisis and conflict during the men's young adulthood were labeled as one of 15 different defenses: Immature (schizoid fantasy, projection, passive aggression, hypochondriasis, acting out, and dissociation); Intermediate (intellectualization/isolation, repression, displacement, and reaction formation); and Mature (sublimation, suppression, anticipation, altruism, and humor). Methods, rationale, and reliability are described in detail elsewhere.^{10, 14}

c. Physical Symptoms with Stress (age 20-60): Six times between college and age 60 years, men were asked "When under stress, what do you now notice about your physical reactions? Please check." A list of 8 (insomnia, headaches, abdominal pain, diarrhea, sweating, palpitations, cold hands and feet, can't concentrate) were included. The average number of symptoms reported on each returned questionnaire was multiplied by 6 (the number of questionnaires sent). Scores ranged from 8 to 24. Methods are discussed in detail elsewhere.¹⁵

d. Alcohol Abuse/Dependence: Severity of alcohol abuse was rated for each man based on all available data using the methodology described elsewhere.¹⁶ The scores assigned to the men were as follows: 1 = no alcohol abuse; 2 = met DSM-III criteria for alcohol abuse; and 3 = met DSM-III criteria for alcohol dependence.

e. Evidence for Major Depressive Disorder before age 50: Since the DSM-III criteria were not developed until almost 10 years later each man was rated on objective signs of major depressive disorder present before age 50 by an independent psychiatrist. Items included: diagnosed significantly depressed by a clinician, relatives with major depression, anti-depressant medication, anergia or anhedonia, suicidal preoccupation, manic symptoms, and neurovegetative signs.¹⁷

f. Psychosocial Adjustment (age 30-47 years) (n=110): On the basis of all reported behavior since college the men were rated for the presence or absence of 8 variables including: occupational advancement, job satisfaction, marital satisfaction, recreation with others, sick leave, enjoyable vacation, income > \$20,000.¹⁸

IV. LATE LIFE VARIABLES:

- a. In Who's Who in America (n=152): 1 = not found in Who's Who in America; 2 = found in Who's Who.
- b. Psychosocial Adjustment (Age 50-65) (n=147): On the basis of all reported behavior since age 47 the men were rated for the presence or absence of 10 variables including: occupational decline, little vacation, sick leave, career and marital dissatisfaction, tranquilizer and psychiatrist utilization.¹⁸
- c. Physical Health (Age 65) (n=147): A physician blind to all data except from a recent physical examination rated the men's health at age 65. 1 = excellent; 2 = minor health problems (e.g. glaucoma, single joint arthritis); 3 = chronic illness without disability (e.g. diabetes); 4 = chronic illness with disability and/or restricted activity (e.g. multiple sclerosis); 5 = deceased.
- d. PTSD Symptoms (Age 65) (n=107): In 1988, the surviving men were again sent a special questionnaire which focused on their military experiences. The questionnaire included a checklist of symptoms of PTSD derived from the DSM-III. One hundred seven (84%) of the 127 veterans who served overseas and survived until 1988 returned questionnaires. The 1988 questionnaire asked the men (age 64-70) questions about the presence of specific symptoms of PTSD "today". The symptoms were: (1) recurrent and intrusive recollections of combat, (2) recurrent distressing dreams of combat, (3) sleep difficulties, (4) exaggerated startle response, (5) inability to feel emotion (present period only). A total score from 0-5 was assigned by adding the symptoms still present in 1988. (Range = 0-3)

e. Trait "Neuroticism" (age 65) (n=100): Obtained by a standardized paper and pencil test, the NEO-Personality Inventory ^{19,20}; (Mean = 68.3, S.D. 21.1). One of its subscales "Depression" was obtained in the same fashion.

Data Analysis: Because many statistical comparisons were being considered, some could be minimally significant by chance. The Bonferroni correction was not done because it would have been overly conservative; instead we elected to use $p < .03$ as the test of minimal significance.

RESULTS:

As shown in Table 1 excluding the 13 drops and 6 WW II deaths, ninety percent (224) of the 249 Grant Study men entered the armed forces at an average age of 22. Of these 224 men 152 (68%) served overseas for at least one month and 54 men were rated high on the Combat Exposure Scale (scores 7-10). All were assessed for symptoms of PTSD in 1946. This group of 152 men will be used in those analyses concerned with the health of the men, and where attrition needed to be minimized for statistical power.

Of the 152 men, 25 had died prior to 1988 and 20 did not return the 1988 questionnaire. Tables 2 and 3 focus upon this subset of 107 surviving veterans who served overseas and who responded to the 1988 questionnaire.

The first step in data analysis was to determine the predictors of combat exposure. Potential predictors included mental health, social class, physical fitness and enthusiasm for military life. The second step was to determine the predictors of symptoms of PTSD and determine if these differed from the

predictors of combat and of other forms of postwar psychopathology (e.g. trait neuroticism, psychiatric visits, etc.). Potential predictors included combat, and mental health variables (childhood environment, physical symptoms with stress, college soundness and maturity of defense mechanisms). The third step was to examine the consequences of heavy combat exposure and postwar PTSD symptoms; physical health, psychosocial health and persistence of PTSD symptoms were the outcome variables studied.

Predictors of Combat Exposure: Symptoms of PTSD in 1946 were significantly associated with combat exposure ($r = .36$, $p < .001$, $n = 152$; $r = .29$, $p < .001$, $n = 107$). But a different set of premorbid variables predicted combat exposure than predicted symptoms of PTSD. Men who experienced heavy combat were more active in athletics before the war, were unusually proud of their military organization, reported a strong urge to join the armed forces, and tended to come from upper-class families. Thirty-eight (48%) of the 79 men who experienced combat (and 15 (60%) of the men with combat scores > 7) were classified as "upper class" in college as contrasted to only 20 (27%) of the 73 men who never served overseas ($\chi^2 = 6.9$, $p < .01$, $df = 1$). These variables, however, either bore no or a negative relation to PTSD symptoms and to trait neuroticism. Not surprisingly, high combat exposure was significantly associated with reporting multiple physical symptoms when "danger stared me in the face." But reporting many physiological symptoms under danger was not significantly associated with neuroticism or with reporting physiological symptoms with stress before the war.

Predictors of PTSD: Upon returning to civilian life in 1946 only 17 men of the 152 veterans who served overseas reported 2 or more PTSD symptoms; 12 of these 17 men had high combat scores. Twenty-one men reported one PTSD

symptom; 12 of these men had high combat scores. Of the 11 men who were wounded, all reported subsequent symptoms of PTSD.

Only one veteran met full DSM-III criteria for PTSD. After the war he developed both alcoholism and major depressive disorder and eventually killed himself. Four men almost met diagnostic criteria for PTSD. Of these one man remained symptomatic in 1988; another committed suicide unexpectedly; a third was murdered, and a fourth has cut himself off socially and did not complete the 1988 questionnaire. (The college mental health of these men was average). Thus, 4 of the 6 most symptomatic veterans (all with high combat exposure) did not return the 1988 questionnaire. Of the 32 men with high combat who returned the 1988 questionnaire only 3 currently reported 1 or more symptoms of PTSD. However, of the 11 men with 2 or more PTSD symptoms in 1946 5 had died, 2 were still symptomatic in 1988, and one did not return a 1988 questionnaire. Thus, only 2 men with 2 or more PTSD symptoms in 1946 actually reported no symptoms of PTSD in 1988.

Sixteen men had high combat scores but reported no PTSD symptoms in 1946, and in 1988 still could not recall ever having had such symptoms. When contrasted to men who experienced PTSD symptoms, these 16 resilient men did not manifest less neuroticism; but they did as young adults manifest more mature defenses. Although maturity of defenses was positively correlated with combat exposure, in the high combat group maturity of defenses was negatively correlated ($\rho = -.33$, $p = .032$, $df = 31$) with symptoms of PTSD. Expressed differently, the 16 men with high combat exposure and mature defenses (age 20-47) reported an average of 0.19 PTSD symptoms while the 17 men with high combat and less mature defenses reported an average of 1.70 symptoms (t -test 2.75, $p = .01$ two tailed, $df = 31$).

The Contribution of Psychological Vulnerability to PTSD: Premorbid

psychological vulnerability was not associated with combat, but it was with trait neuroticism measured four decades later (Table 2). Civilian stress symptoms were highly correlated with neuroticism ($\rho=.53$, Table 3). In contrast, the number of PTSD symptoms and physical symptoms with danger was significantly associated with combat but not associated with neuroticism (Table 3). Neither the tendency to experience stress with physiological symptoms before or after the war was significantly associated with symptoms of PTSD in 1946 or number of physiological symptoms reported during combat danger. The exceptions to this generalization were the 11 men were exposed to minimal combat who still reported symptoms of PTSD in 1946 or 1988. At age 19 these men had scored significantly higher on emotional symptoms with stress, 7.0 (SD 2.8), than the 32 men with combat exposure who reported PTSD symptoms, 5.1 (SD 5.1) (t-test 2.1, 41df, $p=.042$ two tailed).

Multiple regression revealed that of the 4 potential premorbid predictors of PTSD symptoms—poor childhood, psychological soundness in college, physical symptoms with stress and combat exposure, only combat exposure made a significant statistical contribution to PTSD symptoms ($t=4.09$, df 144, $p=.0001$).

Table 3 illustrates that symptoms of PTSD reported in 1946 were not significantly correlated with evidence of major depressive disorder, with alcohol abuse, or poor psychosocial adjustment. However, trait neuroticism measured at age 65 years was significantly correlated with these diverse indices of poor mental health measured throughout the life span (including bleak childhood, psychiatrist utilization, immature defenses, and poor psychosocial outcome at age 47 and age 65).

Table 4 further differentiates the experience of symptoms of PTSD as a long-lasting physiological response to overwhelming wartime trauma from the physiological symptoms associated with the trait neuroticism and with nonspecific civilian stress. With the exception of depersonalization, no physiological symptom experienced with combat danger was associated with neuroticism.

Consequences of Combat and of PTSD: Table 3 shows that after the war men with high combat exposure continued to report increased symptoms of PTSD 40 years later. Such men were also more likely to be in Who's Who in America, and to enjoy a good psychosocial outcome, mature defenses, and low neuroticism. However, exposure to high combat predicted poor future physical health. Fifty-six percent of the 54 men who experienced heavy combat (and 59% of the subsample of 27 men who experienced heavy combat and PTSD symptoms) were chronically ill or dead by age 65. Excluding the 6 war related deaths, only 39% of the remaining 192 men for whom health data was available suffered similar physical morbidity (chi: square 5.6 df = 1, $p < .02$).

DISCUSSION:

On the one hand, to clarify the enduring effects of wartime stress the present study group has four serious disadvantages. First, it excludes men with four of the most important predisposing factors for PTSD: low socio-economic status, minority group membership, poor education and low military rank.^{4,21} Thus, in spite of heavy combat exposure our study group experienced relatively few PTSD symptoms. Second, our PTSD scales had to be derived from information available in 1946 rather than derived from more recently devised assessment tools like the 35 item Mississippi Scale¹³ or the DSM-III. Third, other researchers have noted that symptoms of PTSD may persist for a

lifetime.^{1, 22, 23} However, in our study group due to selective attrition, and reduced risk factors only 8 veterans, and only 5 with combat exposure scale scores greater than 4, reported current symptoms of PTSD in 1988. Fourth, our study group does little to illuminate the so-called delayed onset of PTSD.^{22, 24} In our study only 3 men currently report PTSD symptoms who had noted none in 1946. One such man was an ex-marine who had experienced intense combat in the Pacific. In 1988 he could recall that after the war he played music to reduce night fears. Recently, he has begun awakening with bad war memories; he still experiences survivor guilt. His psychosocial adjustment was among the best in the study.

On the other hand, our study group enjoys two redeeming advantages. First, it provides a means of studying the symptoms of PTSD prospectively over the entire life course with the most important confounding variables like antisocial personality, childhood abuse and social disadvantage excluded. Second, our community sample was collected without the distorting effects of psychiatric patienthood or potential secondary gain due to disability claim status.

The present study lends support to the importance of distinguishing post-traumatic dissociative disorders from most anxiety disorders. As the disparate experimental work of both Horowitz²⁶ and LeDoux²⁷ suggest, neither psychodynamic nor conventional learning theories are equipped to account for long lasting human response to extreme trauma. Such memories can become vividly and intrusively imprinted and may persist undiminished for decades.^{22, 28} In contrast to conventional anxiety symptoms, PTSD symptoms may fail to extinguish as novelty is reduced and as social supports are increased. More important, in contrast to DSM-III anxiety disorders, PTSD

symptoms while leading to subjective distress may not lead to impaired post morbid function (Table 2).

If post-traumatic morbidity after trauma is defined not by the PTSD symptoms in DSM-III but by variables like neuroticism, major depressive disorder, substance abuse and (as in McFarlane's²⁹ study of firefighters) the GHQ³⁰, then premorbid psychological vulnerability will predict post-traumatic disorders. In such studies McFarlane's³¹ thesis that family histories of depression and anxiety disorders will be elevated is likely to be supported. But the pure PTSD symptoms of our trauma survivors seemed relatively independent of trait anxiety. For example, in our study group the GHQ (available for only 58 men) significantly correlated (ρ .35, p =.006, df = 49) with neuroticism but not with PTSD symptoms (ρ .08, n.s., df = 56).

Again, studies noting the post-traumatic morbidity of PTSD stemming from chaotic childhoods or from situations like the war in Vietnam usually confound co-existing genetic or developmental risk with discrete traumatic events. Thus, in the North Carolina ECA sample, Davidson et al observed that individuals who met diagnostic criteria for PTSD were 20 times more likely to carry the diagnosis of somatization disorder, schizophrenia or panic disorder,³² but in most of their cases the traumatic events occurred in childhood.

Our data, however, together with that of some investigators,^{3, 4, 7, 33} confirm that severity of trauma is the best predictor of who is likely to develop PTSD and that the distress of such symptoms do not necessarily produce disability. While it is possible that our results were distorted by the increased mortality of men with high combat and PTSD, in later life we found that the

number of PTSD symptoms correlated only minimally with poor psychosocial outcome.

Table 1

Attrition of Study Group

<u>Original Sample</u>	N = 268
— Less 13 dropouts and 6 World War II deaths	N = 249
— Less 25 men who did not enter service	N = 224
— Less 72 men who did not go overseas	N = 152
 A. First Comparison Group:	
<u>Overseas Veterans at risk for Combat and PTSD</u>	N = 152
 No Combat N=45 (6 died, 6 no 1988 response) 1988 Questionnaire Returned	N = 33
Low Combat N=53 (5 died, 6 no 1988 response) 1988 Questionnaire Returned	N = 42
High Combat N=54 (14 died, 8 no 1988 response) 1988 Questionnaire Returned	N = 32
 B. Second Comparison Group:	
<u>Total Number of Men Returning 1988 Questionnaire</u>	N = 107

Table 2

**Premorbid Correlates of Combat,
PTSD Symptoms, and Neuroticism**

<u>Premorbid Variables</u> (assessed at age 19)	Combat Exposure n=107	PTSD Symptoms (1946) n =107	Trait Neuroticism (1945) n=91
Social Class of Parents	.32*	.06	-.18
Warm Childhood Environment	-.12	-.02	-.22*
Psychological Soundness in College	-.03	-.08	-.14
Active Sports Participation	.21*	.03	-.20
Physical Symptoms with Stress (age 19)	.00	.00	.17
<u>Wartime Variables (1946)</u>			
Urge to join the Military	.29**	.11	.00
Pride of Organization	.36**	.05	-.14
Combat Exposure	—	.29**	-.10
Physical Symptoms with <u>Danger</u>	.55**	.26*	.12

*p <.03 **pp <.001 Spearman correlation coefficients

Table 3

Postwar Correlates of Combat, PTSD Symptoms and Neuroticism

<u>Wartime Variables</u> (1946)	Combat Exposure n=107	PTSD (1946) n=107	PTSD (Age 65) n=107	Trait Neuroticism n=91
Combat Exposure	—	.29**	.20*	-.10 (!)
Physical Symptoms with <u>Danger</u>	.55**	.26*	.27*	.12
PTSD Symptoms 1946	.29**	—	.09	.16
<u>Midlife Intervening Variables</u>				
Many Visits to Psychiatrist (age 20-47)	.01	.18	.07	.27*
Mature Defenses (age 20-47) (n=82)	.24* (!)	.10	.02	-.39**
Physical Symptoms with <u>Stress</u> (age 19-60)	-.09	.01	.02	.53**
Alcohol Abuse/Dependence (age 19-60)	.08	.11	.09	.29*
Major Depressive Disorder (age 19-50)	-.02	.11	.12	.38**
Poor Psychosocial Adjustment (age 30-44) (n = 82)	-.09 (!)	.03	.03	.30*
<u>Late Life Outcome Variables</u>				
In <u>Who's Who in America</u> (n = 82)	.21*	.12	.15	-.09
Poor Psychosocial Adjustment (age 50-65)	-.07 (!)	.19*	.03	.34*
PTSD Symptoms 1988 (age 65)	.20*	.09	—	.20*
Trait Depression (age 65)	-.12 (!)	.11	.25*	.78**
Poor Physical Health (age 65) ^a	.16*	.11	NA	NA

* $p < .03$ ** $p < .001$ Spearman correlation coefficients

(!) Trend toward positive mental health in men exposed to high combat.

a. $n = 147$ Since many men with high combat died before 1988 the correlation of health with combat and PTSD was based on all men alive in 1946.

Table 4

**Association of Specific Symptoms under Danger
with Combat, PTSD Symptoms and Neuroticism**

Symptoms in World War II reported in 1946	Combat Exposure n=107	PTSD Symptoms (1946) n =107	Trait Neuroticism n = 91
General nervousness	.47**	.25**	.07
Irritability	.23*	.06	.13
Fear of going crazy	.31**	.11	.11
Muscle tightness	.25*	-.03	-.03
Felt paralyzed	.28*	.11	.11
Cold hands and feet	.23**	.16	.04
Depersonalization	.25*	.22*	.26*
Dyspnea	.09	.18*	.06
Nausea/abdominal distress	.22*	.19*	-.01
Sweating	.19*	.07	-.01
Shaking	.14	.18*	.12

Spearman correlation coefficients

* p = <.03 **p < .001

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